WE CLAIM:

1. A method of identifying a transmitter in a distributed digital television transmission network, including a plurality of transmitters and a plurality of receivers, comprising the steps of:

a) providing a signal to be transmitted to each transmitter;

b) embedding an identification sequence into the signal, indicative of the transmitter of origin, forming a combined transmission; and

c) transmitting the combined transmission from each transmitter.

2. The method according to claim 1, further comprising:

d) receiving a transmitted signal, including direct combined transmissions from each transmitter, reflected combined transmissions from each transmitter, and noise, at a reception site; and

e) determining the transmitter of origin for at least one of the direct and reflected combined transmissions from the transmitted signals.

3. The method according to claim 2, wherein the distributed digital television transmission network is a single frequency network; wherein step a) includes providing a signal to be transmitted at the same frequency to each transmitter; and wherein step e) further comprises determining the transmitter power level, and transmission time delay for each of the direct and reflected combined transmissions from the transmitted signal; and

the method further comprising:

f) tuning at least one of signal power level and relative time delay of at least one transmitter in accordance with results of step e) to minimize multi-path effects in intended coverage areas of the network.

4. The method according to claim 3, further comprising repeating steps d) and e) at various locations within the network, wherein step f) is optimized for the various locations within the network.

5. The method according to claim 2, wherein the signal is a digital television signal.

6. The method according to claim 5, wherein step b) includes embedding the identification sequence in-band with the signal.

7. The method according to claim 6, wherein the identification sequence is embedded at least 10 dB below a noise threshold of the transmitted signal, whereby the identification sequence has very little effect thereon.

8. The method according to claim 5, wherein the identification sequence is time synchronized to the signal frame structure of the digital television (DTV) signal.

9. The method according to claim 2, wherein the identification sequences are substantially-orthogonal pseudo-random sequences.

10. The method according to claim 9, wherein step e) includes correlating the transmitted signal and a locally generated identification sequence, substantially identical to the identification sequence from one of the transmitters, to obtain a cross-correlation function, whereby when the locally generated identification sequence is identical to the identification sequence from the one transmitter, the cross-correlation function includes an impulse.

11. The method according to claim 10, wherein step e) further comprises obtaining an impulse response for one of the transmitters from the cross-correlation function.

12. The method according to claim 10, wherein step b) includes embedding a Kasami sequence as the identification sequence using a Kasami sequence generator.

13. The method according to claim 12, wherein initial values of the sequence generators are similar for adjacent transmitters, thereby facilitating the determination of the transmitter of origin.

14. The method according to claim 12, wherein step e) includes using one of: an Advanced Television Systems Committee (ATSC) DTV field synchronization PN-511 sequence, a cyclic prefix from a Digital Video Broadcasting-Terrestrial (DVB-T), and a cyclic prefix from an Integrated Services Digital Broadcasting-Terrestrial (ISDB-T) signal for detection of the Kasami sequence and for synchronization of the Kasami sequence with the identification sequence.

15. The method according to claim 14, wherein step e) further comprises correlating only a segment of the transmitted signal and the identification sequence from each transmitter.

16. The method according to claim 15, wherein step e) includes a sliding window technique to select the transmitted signal for correlating with the locally generated identification sequence.

17. The method according to claim 16, wherein the segment of the transmitted signal has a length substantially equal to a length of a DTV field plus twice a length of a delay spread of a channel impulse, whereby each segment substantially begins at a starting point of each DTV field minus one delay spread and ends at a end point of the DTV field plus one delay spread; and wherein a length of a sliding window is substantially equal to the length of one DTV field.

18. The method according to claim 17, wherein the cross-correlation function between the segment of the transmitted signal and the identification sequence is between 40 μs and 600 μs in duration.

19. The method according to claim 15, wherein step e) includes correlating over a plurality of segments to obtain a plurality of cross-correlation functions, and averaging the plurality of cross correlation functions to cancel out noise and improve resolution.

20. The method according to claim 19, wherein step e) includes aligning corresponding peaks in each cross-correlation function before averaging.

21. The method according to claim 20, wherein step e) further comprises filtering side lobes from impulses in the cross-correlation functions.

22. The method according to claim 2, further comprising:

repeating step e) to determine cross-correlation functions with impulses indicative of direct combined transmissions from at least three transmitters;

determining differential time delays between the direct combined transmissions from the at least three transmitters; and

determining geographic location of reception site based on known geographic locations of the at least three transmitters.

23. The method according to claim 22, wherein the identification sequences are substantially-orthogonal pseudo-random sequences with negligible cross-correlation.

24. The method according to claim 23, wherein the identification sequences are selected from the group consisting of Kasami sequences and Gold sequences.

25. The method according to claim 12, further comprising inverting the amplitude of the Kasami sequence for transmitting one bit of information per one or more Kasami sequences, whereby data is transmitted to provide information to the receiver.